

**RESPONSES TO COMMENTS
FROM
COLORADO DEPARTMENT OF HEALTH
AND
U.S. ENVIRONMENTAL PROTECTION AGENCY
ON DRAFT FINAL OU12 RFI/RI WORK PLAN**

EG&G Rocky Flats
Rocky Flats Plant
Golden, Colorado

September 21, 1992

ADMIN RECORD

A-OU12-000026

REVIEWED FOR CLASSIFICATION/UCM
By Bea Duran (unc)
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GENERAL COMMENTS

EPA-G1 Section 1.0 describes the OU12 background and physical setting. The text is similar to other work plans and provides an adequate description of the site. Several of the figures used in Section 1.0 have come from work plans for other OUs with little or no modification. Therefore, several minor improvements in the figures would make them appropriate for this work plan. The specific comments sections discusses these improvements.

Response: See responses to specific comments.

EPA-G2 Section 2.0 (site characterization, previous investigations, geology and hydrology, nature of contamination, and site conceptual model) is largely drawn from existing documents. The site characterization section is based on the historic release report (HRR) and summarizes the history of each individual hazardous substance site (IHSS).

The previous investigations sections summarize several past studies and note that the polychlorinated biphenyl (PCB) contamination at OU12 will be investigated in a separate program. This is important because several potential areas of contamination (PACs) in the HRR are identified as potential PCB spills. Additionally, the sandblasting area, identified as PAC 400-807 in the HRR, will be investigated under the IHSS 157.2 (Radioactive Sites South) activities.

Response: PCB sites will be investigated under TSCA. The addition of PACs or UBCs at this time is premature and will be accomplished using the formal process outlined in the IAG. This work plan includes only those IHSSs currently listed in the IAG for OU12.

The geology and hydrology section summarizes the information found in the *Final Geologic Characterization Report* for 1989 (EG&G, 1990). However, it contains one glaring error: well 15889 has been mislocated on all the figures in this section. This results in some highly improbable hydrologic maps and interpretations. Therefore, this section will require some significant rewriting and changes to all figures which use values from well 15889 for mapping.

Response: Well 15889 has been removed from all figures and maps in the work plan because the actual location lies off of the maps to the west. Water table and isopach maps have been revised accordingly. Text in Section 2.0 has been revised.

The nature of contamination section is based on the HRR and some new validated data. It accurately summarizes the existing knowledge of OU12 contamination.

Response: Text has been revised accordingly.

EPA-G3 Section 4.0 (data requirements and data quality objectives) contains a generic discussion from previous RFP work plans for other OUs. Significantly though, the discussion on sample spacing takes into account the size and type of contaminants in each IHSS. The elements and compounds for analysis includes the complete suite from the target compounds list (TCL), volatile organics, target analyte list (TAL) metals, and radionuclides. This appears to be a

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reasonable Phase 1 approach because of the variety of contamination, the minimal documentation on what was released at each IHSS, and the proximity of the various IHSSs.

Response: Comment accepted.

EPA-G4 Section 6.0 (in the field sampling plan [FSP]) is organized along the lines suggested by CDH and EPA for the FSP OU10 RFI/RI work plan. The described procedures in general appear adequate to meet the objectives set out in Section 6.1 of the FSP. Nevertheless, the FSP must include some discussion of the detection limits for the high purity germanium (HPGe) and the mobile gas chromatograph (GC) systems. Due to special concerns regarding potential calibration problems with the HPGe, SOPs for the radiation surveys using the HPGe, in both laboratory and field settings, must also be submitted as a part of this work plan. Because much of the following work at OU12 will be based on the results of these studies, the quality of the data they generate must be discussed and documented.

Response: Additional discussion regarding the detection limits, operation, and calibration of the HPGe has been included in Appendix G.

The individual figures showing sampling locations for each IHSS are certainly useful and necessary. It might also be advantageous to present all of the IHSSs (except 147.2) and associated sampling locations on one figure. By doing this, duplication of sampling efforts resulting from overlapping IHSSs would be avoided and spatial relationship of all sample locations could be easily discerned.

Response: Overlapping or duplication of sampling efforts has been avoided by placing radiation survey efforts on Figure 6-1, and by reviewing the placement of locations. Placement of all sampling efforts on one figure would result in a very congested, possibly unreadable figure.

EPA-G5 Section 8 (human health risk assessment) presents a cohesive strategy to carry out the human health risk assessment for OU12. It discusses in sufficient detail the four essential components of the risk assessment process as outlined in the *Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual* (RAGS) (EPA, 1989). Each section presents enough information to conclude that the correct methodology will be employed. Although additional specific information would be helpful, it is not necessary as long as all pertinent information will be submitted for EPA review prior to conducting the investigation.

Response: Comment accepted.

The work plan contains two problems areas to EPA's stated position, and EPA guidance (1989). The first is the intention to use the International Commission on Radiological Protection (ICRP) procedures to estimate risk. The second involves the strategy to be used in selecting potential chemicals of concern (COCs). The following sections contain specific comments regarding these deficiencies.

Response: See the responses to specific comments EPA-S53 and EPA-S59 on these two issues.

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EPA-G6 Section 9.0 (environmental evaluation) describes how the OU12 environmental evaluation work plan will be incorporated into the OU9 environmental evaluation. This approach is acceptable as long as the OU9 study covers the entire RFP industrial area.

Response: The OU9 EE does cover the entire RFP industrial area as stated in the OU9 EE technical memorandum dated June 1992.

SPECIFIC COMMENTS

EPA-S1 Section 1.0, Page 1, second paragraph. Several mistakes are present here and corrections need to be made: third sentence, delete the word program and replace the word six with sixteen; the fourth sentence is incomplete and should be either deleted or completed; fifth sentence, CDH is the lead agency for OU12, not EPA.

Response: Text has been revised by deleting "program", correcting the number of OUs at RFP, revising the fourth sentence, and stating that CDH is the lead agency.

EPA-S2 Section 1.3.3, page 21. This section describes the lithology of the Arapahoe Formation and discusses the difficulty in distinguishing between it and the Laramie Formation. It is recommended that the discrepancies that arise from the stratigraphic interpretation put forth in the *Phase II Geologic Characterization*, (EG&G 1992), be more clearly explained here so that subsequent references to the Arapahoe and Laramie formations are consistent and not confusing. Specifically, for the central and western areas of the plant, the Phase II GC report correlates the uppermost or No. 1 Arapahoe sandstone to what it calls the Arapahoe marker bed. It goes on to use the base of this interval as the contact between the Arapahoe and Laramie formations, whereas previous reports include five sandstone intervals in the Arapahoe formation. As a result, the thickness of the Arapahoe formation according to the Phase II GC is between 15'-25' as opposed to approximately 150' as stated in this work plan and in most previous reports.

Response: Text has been revised by describing contrasting logic behind varying Arapahoe Formation thicknesses and noting that all references to the Arapahoe Formation in this report are referring to the Phase II GC description of the Arapahoe Formation.

EPA-S3 Section 1.3.3.8, page 24, second paragraph. The conclusion stated here that the unconfined aquifer at RFP is "... not generally believed to be capable of producing economical amounts of water", must either be quantitatively documented or be deleted. The discussion of hydraulic conductivities of the aquifer in this section is not sufficient to draw such a conclusion.

Response: The conclusion has been deleted from this paragraph.

EPA-S4 Figure 1-4. The legend for this figure shows RFP as draining to various surface water monitoring sites. These monitoring sites are not discussed in the text or legend. The text or legend should describe these sites or they should be removed from the figure.

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Response: Text has been revised to mention surface water monitoring sites, and Figure 1-4 has been revised to indicate with which drainages these surface water monitoring sites are associated.

EPA-S5 Figure 1-8. This figure was first used in the OU8 work plan and still shows the outline of OU8 on the map. This outline should be removed to avoid confusion about its purpose on this figure.

Response: The figure has been revised and the outline of OU8 has been deleted, as requested.

EPA-S6 Figure 1-10. This figure shows a stratigraphic column from LeRoy and Weimer (1971). A more detailed stratigraphic section that also includes a revised interpretation for the contact between the Arapahoe and Laramie Formations must be substituted for the older section. Figure 4-53 from *Phase II Geologic Characterization*, (EG&G, 1992), shows this revision alongside a previous stratigraphic column and would be a much better figure to use in this work plan. It would also conform to the geologic map and cross-section shown in Figures 1-11 and 1-12 that were taken from the same document.

Response: Figure 4-53 from the Phase II Geologic Characterization Report has been reproduced in Figure 1-10 of this work plan, as requested.

EPA-S7 Figure 1-11. This figure is a geologic map of the RFP area. The symbols for the cross section should be added to the explanation portion of this figure.

Response: Symbols for the cross section have been added to the explanation on the figure.

EPA-S8 Figure 1-12. This figure is a geologic cross section, the ends of which should be labeled A and A' to correspond to its location on the previous geologic map.

Response: Cross section A-A' has been labeled on the figure.

EPA-S9 Section 2.1.3, page 7, second paragraph. The first sentence incorrectly states that the outline of IHSS 157.2 includes the soils surrounding building 440. It actually runs along the north side of building 440 and only includes the paved area north of 440.

Response: Text has been revised accordingly.

EPA-S10 Section 2.1.3, page 8, first paragraph. This paragraph discusses background contaminant levels in a ditch south of Building 444. It is unclear how these background values relate to the site-wide background geochemical report. This must be clarified.

Response: It is unlikely any correlation can be made between the 1954 ditch samples with radioactivity levels that were stated to be above background and background levels evaluated in the

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background geochemical report generated from 1989 data. No quantitative data from 1954 are available to make such comparisons.

EPA-S11 Section 2.1.7, page 16. IHSS 147.1 has been officially transferred to OU9 for investigation and need not be included in the final version of this work plan.

Response: Discussion of the transfer of IHSS 147.1 to OU9 has been added to the text. A brief discussion of this IHSS has been retained in Section 2.0 to supplement the discussion of the transfer. It is deleted from discussion after Section 2.0.

EPA-S12 Section 2.2.2, page 26, first paragraph. Since many of the PCB sites fall into the OU12 boundaries, it is appropriate to briefly discuss here the plans for investigation of these sites. The statement that it is assumed that separate programs will handle such activities is insufficient.

Response: It is currently intended for PCB sites to be investigated under TSCA, not under RFI/RI activities. DOE is currently preparing a strategy for PCB site investigations under TSCA, and the agencies will be involved in review and decision making related to the proposed strategy. Discussion of the proposed PCB site investigation approach has been added to the text. See response to comment no. EPA-G2.

EPA-S13 Section 2.2.2, page 26, second paragraph. This section discusses previous investigations and the impacts of other OUs on OU12. However, it does not discuss how investigations of IHSSs found within the boundaries of OU12 but assigned to other OUs will be coordinated with the OU12 investigations. This must be clarified in this section.

Response: The text has been revised to discuss coordination of overlapping IHSS investigations.

EPA-S14 Section 2.3.2, page 33, second paragraph. The third sentence incorrectly states that alluvial water levels are highest during late summer and fall. Spring to early summer is when recharge is greatest and the water table is highest. The significance and veracity of the last part of the sentence, "... whereas some wells go dry at this time of year.", needs further explanation.

Response: Referenced sentence has been deleted.

EPA-S15 Section 2.3, page 28, paragraph 2. This paragraph states that Appendix D contains borehole logs for all well locations used in the work plan. The borelog for Well 15889 could not be found in the appendix. This borelog needs to be added, and Appendix D needs to be checked to make sure it contains all the wells shown on Figure 2-30.

Response: Well 15889 is no longer included in the OU12 hydrogeologic discussion (see comment no. EPA-G2). Borelog for well 15889 will not be included in Appendix D.

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EPA-S16 Section 2.3.2, page 35, paragraph 2. The influence of infilled utility trenches and footing drains to the hydrogeology of OU12 is discussed in this paragraph. These potential preferred migration pathways are very important and must be identified as thoroughly as possible prior to any sampling so that sample locations are appropriately located. The statements here indicate that locations of these features will not be determined prior to initiating fieldwork and therefore will not be used in placing sample locations in areas of potentially preferred migration pathways.

Response: Engineering drawings of utility lines at OU12 IHSSs will be reviewed in the initial data review task of the RFI/RI, which is conducted prior to any sampling activities. The extent to which these features act as preferential flow paths will be addressed in the proposed technical memorandum for surface water, sediment, footing drains, and ground water. Any information obtained during data review activities will be coordinated with the industrial area investigation.

EPA-S17 Section 2.3.2, page 36, paragraph 2. This entire paragraph must be deleted since the mislocation of well 15889 explains what appeared to be a very anomalous ground water mound.

Response: Paragraph has been deleted. Figures 2-34 and 2-35 have been changed.

EPA-S18 Section 2.4.1, page 37, paragraph 2. This paragraph discusses a release that contaminated the IHSS 116.1 area. However, the time frame of the release is not given. The time of the release should be added to this discussion if available.

Response: As stated in the first sentence of Section 2.4.1.1, additional information on the release is not available.

EPA-S19 Section 2.4.1.1, page 38, paragraph 2. This paragraph states that normal beryllium concentrations are 0.01 to 2 milligrams per gram (mg/g) of soil. However, no reference for citing this relatively high background value is given. A reference must be added for these values.

Response: Reference to the HRR has been added to the discussion.

EPA-S20 Section 2.4.2.1, page 43, paragraph 1. This paragraph discusses beryllium concentrations in soils and refers to Figure 2-37. The units of concentration for beryllium on Figure 2-37 are explained as micrograms per kilogram ($\mu\text{g/kg}$) whereas the units are expressed as mg/kg on page 43 and Table 2.4. This discrepancy needs to be corrected.

Response: Units on Figure 2-37 have been changed to mg/kg.

EPA-S21 Section 2.4.2.1, page 43, paragraph 1. This paragraph states that chromium concentrations ranged from 5.5 to 34 mg/kg. These values include concentrations in the deeper spoils, which are those below 3 feet deep. However, Figure 2-37 shows only the chromium concentrations

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for shallow soils. The text must be clarified to note that Figure 2-37 depicts data from only the top three feet.

Response: Text has been revised accordingly.

EPA-S22 Section 2.4.2.1, page 43, paragraph 2. The data presented in Table 2-4 indicate slightly higher concentrations in soils at depths greater than 3 feet as opposed to slightly lower as stated in the text. This must be corrected.

Response: Text has been revised accordingly.

EPA-S23 Section 2.4.2.1, page 44, last paragraph. This section states that ground water quality data is only available from two wells in the vicinity of OU12, neither of which actually lie in its boundaries. Were none of the dozen or so wells which are actually shown to be in OU12, actually sampled for ground water analysis? If they were sampled, why is the data not available?

Response: A search of databases at the RFP indicates that only two wells are sampled. The remaining wells, due to artificial conditions in the industrial area, function as piezometers only or are dry.

EPA-S24 Section 2.4.2.2, page 47, paragraph 4. This section discusses the shallow soil and ground water analytical data in relation to background data presented in the *Background Geochemical Characterization Report* (EG&G, 1990). After review by EPA, the geochemical characterization approach has been extensively revised. Therefore, discussion of contamination compared to background must be qualified as related to interim values at this time.

Response: Discussion has been added to the text regarding the use of background data from the referenced report.

EPA-S25 Section 2.5.4, page 59. The primary goal of the OU12 RFI/RI is to gather data that can be used to define the nature and extent of contamination, which can also be used to support a Baseline Risk Assessment. This correction must be made to the first sentence of this section.

Response: Correction has been made to the first sentence.

EPA-S26 Figures 2-29, 30-, 31, 34, 35, 36, 37, and 38. These figures have well 15889 mislocated. The *Geological Characterization Report* (EG&G, 1992) lists the state coordinates for this well as being 749125 North and 2080718 East. This puts well 15889 about 2000' west of the location shown and at the west central edge of these figures. When properly plotted, all anomalous features disappear from these figures. This well must be plotted in the correct location, and the associated figures and text related to this misplacement must also be corrected as needed. Additionally, it is suspected that wells 17889, 11989, and 11589 were abandoned in 1989. The

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active or abandoned status must be verified for all wells shown in these figures, so that existing active wells might be incorporated into the field sampling plan.

Response: Well 15889 is located off of the figures to the west and is not included in the OU12 work plan. The affected figures have been revised accordingly.

EPA-S27 Section 3. The preliminary identification of potential chemical-specific Applicable or Relevant and Appropriate Requirements (ARARs) for surface water and ground water presented in this section is the subject of a separate review process and comments from the EPA and CDH will be submitted in a separate document. The final version of this work plan must be amended to reflect any such comments that are submitted.

Response: Comments received in a timely manner before this work plan is due will be included although no comments regarding CSBs have been received to date. Section 3 has been revised to refer to Chemical Specific Benchmarks in a similar manner as the OU8 work plan.

EPA-S28 Section 3.2, page 8, paragraph 3. Preliminary Remediation Goals (PRGs) for those chemicals that do not have ARARs associated with them should be calculated assuming more than industrial land use as is stated here. A future onsite residential land use scenario must also be used in such calculations so that a range of PRGs might be established that can be applied to various future land uses.

Response: Land use scenarios will be determined in the Exposure Assessment technical memorandum, within the BRA.

EPA-S29 Section 4.1.2.2, page 4, paragraph 4. This paragraph states that the mean concentration of chromium in OU12 is less than the background concentration. It is significant that none of the sample locations are within the areas of the former cooling tower ponds that were thought to be contaminated with chromium. Therefore, chromium contamination levels at OU12 are still unknown. This fact must be added to this discussion.

Response: The discussion has been revised accordingly.

EPA-S30 Section 4.1.4, page 7, paragraph 2. The first sentence states that select OU12 IHSSs will be characterized for nature and extent of contamination. This must be changed to apply to all OU12 IHSSs.

Response: Sentence has been revised accordingly.

EPA-S31 Section 4.1.4, page 7, last paragraph. Collection of OU12 surface water data through the sitewide program is mentioned here. To ensure that the needs of the OU12 RFI/RI are met for this type of data, additional discussion must be included in Section 6, Field Sampling Plan, regarding surface water sampling locations, numbers of samples, types of analysis, etc.

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Response: A surface water FSP for the entire industrial area is currently being developed by EG&G and will be submitted in early 1993 as a technical memorandum to the OU12 work plan.

EPA-S32 Section 4.2.5, page 16, paragraph 3. What is the sixth type of activity to be performed? (Only five are listed here).

Response: There are only five types. The sentence has been revised accordingly.

EPA-S33 Section 5.5.2, page 8, last paragraph. "Site-specific background concentrations" are cited as being the levels above which sample concentrations are considered evidence of contamination. The term, site-specific background concentrations, needs to be further defined so that its applicability may be assessed.

Response: "Site-specific background concentrations" are determined using evaluations of all available data and regulatory standards and guidelines. Values used for comparison will be proposed and negotiated with the agencies during the RFI/RI.

EPA-S34 Section 5.5.2, page 9, paragraph 1. This paragraph states that data will also be compared to sitewide background values from the *Final Background Geochemical Characterization Report for 1989* (EG&G, 1990). As previously stated, background values from this report have not been approved as being final values for such uses.

Response: It is recognized that values from the Background Geochemical Characterization Report are not approved for the stated comparisons. The values are used relatively and the document is used for guidance only.

EPA-S35 Section 6.2.1.1, page 4, paragraph 2. The assumption that "... radionuclide distribution is relatively homogeneous over the field of view, and that the distribution varies only with depth" may not be valid for releases that have impacted relatively small areas, as is the case for many in OU12. Field of view for the HPGe is stated as being a circle of either 45' or 195' in diameter, depending on mounting height. Further discussion must be included that will define "relatively homogenous" and clarify this statement.

Response: Homogeneity is a function of the averaging effect of the HPGe detector, which is only used as a screening tool, that will be supplemented by NaI probe measurements and select laboratory radionuclide analysis.

EPA-S36 Section 6.2.1.1, page 5, paragraph 2. The use of tripod vs. vehicle mounted detectors is discussed here. It is also necessary to discuss any differences in sensitivities between the two systems and how results gathered using the different techniques will be correlated.

Response: Differences in sensitivity are discussed in general in the text. Additional information is included in Appendix G. Correlation of data and a comparison of the two systems will be generally included in the SOPs currently under development.

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EPA-S37 Section 6.2.1.1, page 6, paragraph 1. This paragraph discusses soil sampling for radionuclides in areas now covered with asphalt. It states that depth profiles to use with the HPGe survey will not be taken in these areas. Soil profiles must be taken in these areas for the same reason that it is being done in unpaved areas and also to determine if the original surface soil has been disturbed between the time of contamination and asphalt paving.

Response: As agreed to in the comment resolution meeting, grab samples will be collected beneath concrete or paved areas. Depth profile samples will be taken in exposed soil areas to supplement the HPGe surficial analysis.

EPA-S38 Section 6.2.1.1, page 6, paragraph 2. This paragraph discusses the use of a laboratory-based HPGe detector. It states that the HPGe detector will detect concentrations of gamma-emitting, off-site radionuclides. It is not clear from this statement what is meant by "off-site radionuclides" or how these will be separated from RFP-generated radionuclides. This point must be clarified.

Response: The term "offsite" has been deleted.

Depending upon the confidence level for which the laboratory HPGe detector results will be confirmed by offsite laboratory analysis, it might be prudent to preserve all, or a portion of all soil samples, that will be analyzed by the laboratory HPGe for possible submittal to offsite labs. By doing this, if it is found that there are problems with the laboratory HPGe, it would not be necessary to collect an additional set of samples. Further discussion of this matter in the work plan is necessary.

Response: Samples will be retained until the laboratory HPGe results have been evaluated. Text has been revised accordingly.

EPA-S39 Section 6.2.1.2, page 8, paragraph 1. This paragraph discusses the use of a hydraulic probe rig for soil gas sampling. It states that "at several sites where no historical evidence of volatile organic compound contamination exists, soil and ground water screening samples will be collected in the absence of a prior soil gas survey." The reason for collecting these samples needs to be clarified in the text.

Response: Text has been revised to include soil gas sampling will be performed at all sites suspected of being contaminated with volatile organics and that soil screening and ground water screening will be performed at all sites that is warranted. Reference to a "prior soil gas survey" has been deleted.

EPA-S40 Section 6.3, page 18, paragraph 2. This paragraph discusses how uncontaminated IHSSs will be delineated. Such a discussion is premature and must be eliminated from this section.

Response: Discussion has not been deleted. Some measure of "clean" must be included in the work plan in order to facilitate a finding of No Further Action at an IHSS. Text has been revised per CDH comment and retained.

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EPA-S41 Section 6.3.1, page 22, paragraph 2. The last sentence in this paragraph lists collection and analysis of soil samples from boreholes. It must be clarified that this is the minimum number of samples per borehole. The same comment applies to page 24, paragraph 2.

Response: The word "minimum" has been added to the referenced sentences.

EPA-S42 Section 6.3.2, page 23, paragraph 2. This paragraph discusses the HPGe radiological survey. It states that at the site, concrete must be cored to obtain soil samples under the concrete. Neither Figure 6-2 nor 6-5 show sample locations on concrete. The area to be sampled is shown as pavement, presumably asphalt, rather than concrete. This discrepancy between the text and figures should be clarified.

Response: Text and figure have been revised to reflect the presence of asphalt and collection of asphalt samples.

EPA-S43 Section 6.3.11, page 38, paragraph 1. This paragraph refers to Figure 6-22, however, Figure 6-11 shows IHSS 147.2 referred to in the text. This needs to be corrected.

Response: Figure number in the text has been revised accordingly.

Although no specific releases have been documented for this IHSS, it seems that complete characterization of this site cannot be accomplished by two surficial soil/depth profile samples and the radiation survey. Due to the fact that little is known about this site, additional sampling must be performed. It is recommended to add a soil gas survey, soil and groundwater screening, temporary well points, and one borehole/monitoring well. Thickness of the alluvium at this site is less than 10 feet, so costs involved with the added sampling would be less than other areas. In addition, data from this isolated IHSS could be quite valuable in mapping efforts.

Response: Sampling efforts at this IHSS are staged in similar manner for all other IHSSs. Seven HPGe survey and surficial soil sample locations, NaI probe locations, and three depth profile samples have been included. If surficial sampling indicates that contamination exists, more sampling at depth and possibly of ground water will be performed. Text has been revised to reflect this staged approach.

EPA-S44 Section 6.4.4, pages 41 and 42. The SOPs to be developed for collection of soil and ground water screening samples using the hydraulic probing rig and for measuring water levels and identifying flow direction using a pneumatic water level indicator must be submitted with the final version of this work plan.

Response: Draft SOPs will be submitted or existing SOPs will be modified using a DCN and submitted.

EPA-S45 Section 6.4.6, page 44, third paragraph. The fourth sentence incorrectly references Figure 6-9. the correct figure is 6-12.

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Response: The text has been revised to reference the correct figure number.

EPA-S46 Section 6.5.3, page 51. The text references Table 6.4, when it should reference Table 6.3.

Response: The text has been revised to reference the correct table number.

EPA-S47 Section 6.6, pages 51-52. The Data Management and Reporting Plan presented here is vague and somewhat confusing. Although it is understood that RFEDS is still evolving, a more specific and detailed account of data management and reporting procedures and timeframes is an important part of this work plan and needs to be in place prior to work plan approvals. Clarification of the specific field data parameters that will be entered into RFEDS by way of example will demonstrate that this aspect has been designed prior to startup. In addition, sample tracking report formats from RFEDS must be included in this work plan as well as some description of the timeframes involved in generating and distributing these reports.

Response: Additional detail regarding RFEDs has been added, although a complete description as requested in this comment is not available.

EPA-S48 Section 6, Table 6.1. Overall this table is helpful in presenting a summary of the IAG required vs. proposed sampling activities for OU12, however, in certain aspects it must be clarified and revised. The most confusing portion deals with surficial soil samples and associated footnotes a, b, and c. Specifically, these samples need not be listed twice for IHSS groups 116, 136, 157.2, and 120, but the subsequent analysis activities must agree with the details specified in the text for each IHSS. In addition, footnote 'e' is incomplete and could not be found in the table.

Response: Table 6.1 has been revised, as well as the text and figures. The numbers and types of samples presented on Table 6.1 have been revised to reflect a better understanding of the capabilities of the HPGe detector.

EPA-S49 Section 6, Table 6.5. This table indicates that field blanks are not required for organics. A justification for not using field blanks for organics must be included in either the text or with the table.

Response: Field blanks for organics have been added to Table 6.5.

EPA-S50 Section 6, Figure 6-5. In this figure, it appears that there are a few areas that may need added coverage for the radiological survey. One additional location needs to be added near the southeast corner of building 444, by the ingot open storage area. The south side of building 447 would be covered better if one of the survey locations were moved north 50 feet. One additional location needs to be added in the unpaved area northwest of IHSS 116.1.

Response: Field radiation survey points have been altered to reflect 150 ft grid spacing. A sample point has been placed approximately 50 ft south of the ingot open storage area and south of

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Building 447, approximately 10 feet. In addition, additional locations have been added at IHSS 116.1 which are further supplemented by NaI probe locations.

EPA-S51 Section 7, Page 1, first paragraph. Submittal of this work plan to EPA and CDH occurred on May 8, 1992, not March 8, 1992, as stated.

Response: The text has been revised accordingly.

EPA-S52 Section 7, Page 1, second paragraph. This paragraph is suggesting that lengthy lab turn-around times may result in missing deadlines that have been set forth in the IAG. Since this concern is already being presented, it seems appropriate that actions must be planned now that would initiate and accelerate sampling activities in timeframes that would allow for longer lab turn-around. Such actions will also benefit preparation of the BRA and are more advantageous to the project as a whole than merely suggesting that future extensions may be needed. One possibility might be to arrange for necessary permits ahead of time, so that actual field work could begin in November rather than December. It also seems that less time should elapse between the screening/sampling activity and drilling phase of field sampling activities.

Response: The FSP, as presented, was designed to use screening activities to effectively minimize the quantity of samples sent for laboratory analysis, thereby reducing laboratory turnaround times.

EPA-S53 Section 8.0, Page 2, last paragraph; page 3, first paragraph. The work plan states that "The EPA and DOE require a two-phase evaluation for the radiological portion of the assessment; and, "The implementation of procedures established by the International Commission on Radiological Protection (ICRP) and adopted by the EPA (is) used to estimate the radiation dose equivalent to humans from potential exposure to radionuclides through all pertinent exposure pathways." This statement is not accurate. EPA does not currently require the ICRP method to be used, either alone or in tandem with the methodology presented in RAGS. Indeed, the ICRP method, because it was developed for occupational exposure and based on a "Reference Man," is not entirely appropriate for use at a Superfund site. The reference man is healthy, 20 to 30 years of age, and clearly does not represent the general public that may be exposed to radionuclides. A more complete description of the disparities between ICRP and EPA methodology can be found in *Transuranium Elements, Volume II, EPA Office of Radiation Programs*. Since the risk assessment is intended for EPA, it must use EPA-derived procedures. Until the ICRP method is officially adopted by EPA Region 8, it must not be included in the risk assessment, except perhaps as an addendum.

Response: Section 10 of RAGs specifies that the two-phase evaluation should be utilized for the radiation risk assessment. In addition, DOE requires the use of the two-phase evaluation. Thus, the OU12 risk assessment will utilize the two-phase approach utilizing the ICRP procedures and the computation of health risk based on age-averaged lifetime excess cancer incidence per unit intake and per unit external exposure for radionuclides.

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- EPA-S54** Section 8.0, page 5, third paragraph. The text states, "With DOE's future ecological land use plans for the OU12 industrial area, future onsite residents are not likely target populations". DOE's future plans are irrelevant in a human health risk assessment. The risk assessment must address the possibility of residents living in the area. It is plausible that residential development in the area will occur in the next century when most of the radiological contaminants could still be present. In addition, it would be inconsistent with other OUs, since a residential-use scenario has been the conventional assumption. Intentions, regardless of how altruistic, must not be included in the quantitative risk assessment. A residential scenario must be included in the exposure assessment.
- Response: "ecological" has been removed from the sentence. DOE's future plans are extremely relevant to the human health risk assessment and onsite residential land use will not be included because OU12 is located within the industrial area of the RFP (see comment no. EPA-S28).
- EPA-S55** Section 8.0, page 6, second bullet. Dermal exposure to contaminants in soil was omitted and must be included as a possible exposure route from surficial soils.
- Response: Text has been revised accordingly.
- EPA-S56** Section 8.1.2, page 7, second paragraph. Again the ground work is being laid for activities that may cause delays in the IAG schedule. If additional ground water investigation activities are anticipated, they must be at least tentatively identified and scheduled so that the likelihood of delays can be reduced.
- Response: A ground water investigation for the entire industrial area has been proposed and will be included in OU12. Schedules for this activity will be discussed with the agencies in scoping meetings.
- EPA-S57** Section 8.2.2, page 9, last paragraph. The second sentence delineates TICs that will be excluded from the Human Health Risk Assessment. This statement seems to be premature and must be deleted.
- Response: Statement has been revised.
- EPA-S58** Section 8.2.3, page 10, second paragraph. The word "RFP related" must be removed from the first sentence.
- Response: "RFP related" has been deleted.
- EPA-S59** Section 8.2.4, page 11, second paragraph. The flow chart and description of the strategy to be used in the selection of contaminants of concern (COCs) contains major design flaws. The steps must be rearranged because the order of criteria in the flow chart is as critical to the selection process as is the specific criteria used to select COCs. For example, no class A carcinogen should be eliminated from the risk assessment under any circumstance. However,

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as presented in the flow chart, known human carcinogens could be eliminated in the first or second step. A decision must be made about class A and B carcinogens in the initial screening step.

Response: The flow chart has been revised as indicated on Figure 8-2.

RAGS states that, "In general, comparison with naturally occurring levels is applicable only to inorganic chemicals, because the majority of organic chemicals found at Superfund sites are not naturally occurring." Accordingly, the elimination of background chemicals must be limited to inorganic chemicals. Moreover, background concentrations must be collected from an area minimally impacted by man and must accurately represent the RFP area. Due to natural variation of geographical regions, U.S. Geological Survey data should not be used for this purpose, unless it can clearly be shown that the data were specifically drawn from the area.

Response: Text has been revised addressing comparison to background.

RAGS presents the concentration-toxicity screen in great detail. It should be used instead of the screening step which uses one-tenth health environmental criteria for elimination. The one-tenth criteria is not an EPA-endorsed methodology.

Response: The concentration-toxicity screen has been incorporated.

EPA-S60 Section 8.2.4, page 11, paragraph 3. It is stated here that the data will be evaluated according to RAGS section 5.9.3 to determine if the detection frequency is greater than 5 percent. RAGS does not state that 5 percent is the detection frequency limit - its says that "any detection limit to be used (e.g. 5 percent) should be approved by the RPM prior o using the screen".

Response: DOE-RFO has presented the 5 percent detection frequency limit to EPA and CDH on numerous occasions. It has been agreed to in the past by these Agencies and it is also common to Superfund sites.

EPA-S61 Section 8.2.4, page 13, paragraph 2. This section states that chemicals which are essential human elements need not be considered further in the quantitative risk assessment. Prior to eliminating those chemicals, however, they must be shown to be present at levels that are not associated with adverse health effects. Hence, a quantitative risk assessment must be performed. In addition to the relatively innocuous constituents described in the plan, be aware that chemicals such as arsenic and selenium are also considered essential elements.

Response: The text has been modified to more clearly define the criteria for consideration in the Human Health Risk Assessment.

EPA-S62 Section 8.3.1, page 16, paragraph 2. The definition provided for the Reasonable Maximum Exposure is not exactly correct. Exposure is a function of chemical concentration, contact rate, exposure frequency and duration, body weight, and averaging time. The exposure concentration RME is defined as the 95 percent upper confidence limit on the arithmetic

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average. The RME for the other components of exposure cannot be based solely on quantitative information, but also requires the use of professional judgement.

Response: The text has been modified to better define RME.

EPA-S63 Section 8.4, page 20, paragraph 3. The discussion of toxicity values focuses on RfDs and cancer slope factors with no mention of Inhalation Reference Concentrations (RfCs). These values will be important when assessing the inhalation pathway or the volatilization of contaminants from ground water or surface water. They must also be discussed in this section.

Response: RfCs have been added to the text and will be utilized in the assessment.

EPA-S64 Section 8.4, page 21, paragraph 2. This section discusses the information sources of toxicity values which are used by EPA. The authors should be aware that there is an established hierarchy of data sources within EPA. As described in RAGS, the IRIS system is first, followed by the HEAST, and then toxicity values developed in consultation with the ECAO Technical Support Center. This section gives the reader the impression that, other than IRIS, the other sources of information available are equal in quality and preference.

Response: The text has been revised accordingly. In addition, as required by the IAG, a technical memorandum will be submitted for review and approval listing the toxicological and epidemiological studies utilized for determining toxicity values when values are unavailable in IRIS.

EPA-S65 Section 8.5, page 24, paragraph 2. The method presented in this paragraph for assessing non-cancer health effects is overly aggressive and may be unnecessary. Hazard Quotients (HQs) are initially the sum of all Hazard Indexes (HIs), regardless of mechanism of action. Then, if the HQ exceeds one, the compounds are segregated based on target organ and mechanism of action. This segregation process can be complex and time consuming, and should not be undertaken unless it is known that the sum of all the HIs clearly exceed one.

Response: The text has been revised accordingly to better explain the use of the HQs and HIs. Segregation will only take place as necessary.

EPA-S66 Section 9.1, page 1, paragraph 1. If there are no viable ecosystems or natural habitats presently existing in OU12, as stated here, why is this OU being considered for an ecological preserve?

Response: OU12 is not being considered as an ecological preserve. Text has been revised accordingly.

EPA-S67 Section 9.3, page 3, paragraph 3, bullet 1. The work plan states that the presence of target taxa, which are accumulating or concentrating target analytes, is a criterion for initiating

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ecotoxicological studies. The method for determining concentration or accumulation of chemicals prior to ecotoxicological studies is not clear. The criterion must be clarified.

Response: A list has been prepared of contaminants which are known, based on published laboratory and field studies, to bioaccumulate in plants or animals. During OU12 Phase I investigations, a limited number (<20) of small rodent tissue samples will be collected and analyzed for the presence of the listed contaminants. This study will provide empirical confirmation or denial of contaminant uptake by what is believed to be the dominant mammal species in the Industrial Area.

EPA-S68 Section 9.3, page 3. In the section under Ecotoxicological Investigations, a number of conditions were presented which would trigger an investigation. What about the effect of contaminants moving offsite and adversely affecting target taxa?

Response: Contaminant effects on Target Taxa in the non-operable unit areas beyond OU12 and the Industrial Area boundaries would be considered during development of the Biotic Transport Model. Impacts, if any, of OU12 contaminants on target taxa in adjacent buffer zone operable units (primarily OUS) would be considered during field work for the environmental evaluation (EE) for the potentially affected OU.

EPA-S69 Section 9.0, Table 9.1. The key of status symbols does not include a definition for 9. This definition must be provided.

Response: On Table 9.1, the status of endangered species according to state lists was mistakenly shown in the table as "9". It has been revised to "e", which is shown in the key.

EPA-S70 Section 10, Figure 10-1. This figure should be updated with the names of the personnel who are currently in the positions shown on the chart.

Response: Figure 10-1 has been revised accordingly.